TROPICAL DISEASES BUREAU.

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DISEASES DUE TO PROTOZOAN PARASITES.

VAN SACEGHEM (R.). **Effets de l'inoculation de sang contenant des toxines trypanosomiques, dues à** *Trypanosoma congolense pecorum*, **sur les infections du** *Trypanosoma cazalboui* **var.** *vivax*. [The Effects of Inoculating Blood containing Trypanosome Toxins due to *T. congolense pecorum* on Infections caused by *T. cazalboui* var. *vivax*.]—*Bull. Agric. Congo Belge*. 1923. Dec. Vol. 14. No. 4. pp. 608–609.

In cases in which cattle are infected simultaneously with *T. congolense* and *T. cazalboui* the latter always disappears from the circulation, while *T. congolense* persists, according to the author, and this, he believes, indicates an antagonism between the two.

He has inoculated intravenously cattle infected with *T. cazalboui* with large quantities (one litre) of blood containing *T. congolense*, the trypanosomes having been previously killed by the addition of a trace of emetic. Such injections cause a rapid disappearance of *T. cazalboui* from the circulation, but they reappear after several days.

To make quite sure that this result is not due to the emetic the defibrinated blood has been allowed to stand for 12 hours after the addition of the drug, which during this period undergoes decomposition, producing substances devoid of trypanolytic power. Blood similarly treated failed to cause any disappearance of trypanosomes when injected into animals infected with *T. congolense*.

Repeated injections cause the disappearance of the parasites from the circulation. If an interval of 20 days is allowed to elapse between injections anaphylactic shock is produced.

VAN SACEGHEM (R.). *Trypanosoma congolense* **dans l'Est Africain.** [*Trypanosoma congolense* in Ruanda.]—*C.R. Soc. Biol.* 1924. Dec. 27. Vol. 91. No. 37. pp. 1455–1456.

After summarizing very briefly the literature regarding the animals susceptible to inoculation with *T. congolense* van Saceghem gives details of four dogs which he inoculated with the parasite. The strain used was of bovine origin.

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Dog No. 1. Was infected, but apparently made a complete recovery, and was re-infected.

Dog No. 3. Trypanosomes appeared in the blood about a month after inoculation, and death occurred a month later.

Dog No. 2. Was inoculated from Dog No. 1. The period of incubation was nine days, and death occurred on the 13th day after the appearance of trypanosomes.

Dog No. 4. Inoculated from Dog No. 1. Parasites appeared on the 19th day and death occurred a month later. In both of these animals (2 and 4) there was enormous enlargement of the spleen, and petechiae were found on the peritoneum.

VAN SACEGHEM (R.). **La formol-gélification et le diagnostic des trypanosomiases chez les bovidés.** [The Formol-Gel Test for the Diagnosis of Trypanosomiases in Cattle.]—*C. R. Soc. Biol.* 1925. Jan. Vol. 92. No. 3. pp. 193–195.

Van Saceghem gives tabular statements showing the results of adding 2 drops of commercial formalin to 1 cc. of serum obtained from infected and healthy cattle.

The sera from cattle which were believed to be healthy gelled in periods ranging from 25 minutes to 7 days. Bovines infected with *T. congolense* and *T. cazalboui vivax* yielded sera which was gelled by formalin in periods ranging from 1 hour to a maximum of 9½ hours.

The author concludes that his results are in agreement with those obtained by HORNBY.

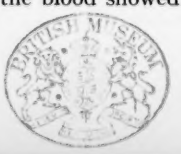
ILOWAISKY (S. A.) & STIEBEN (W. D.). **"Su-aurù" Trypanosomose bei Kamelen u. Pferden in der Kirgisensteppe u. im Uralgebiete.** ["Su-aurù"—Trypanosomiasis of the Camel and Horses on the Khirgiz Steppes and the Ural Area.]—*Rev. de Microbiol. et d'Epidémiol.* 1923. Vol. 2. No. 1/2. pp. 93–95; and 1924. Vol. 3. No. 3. pp. 222–223.

The authors' observations were made during an epidemic in 1922, when hundreds of animals died, but the occurrence of trypanosomiasis on the Steppes has been recognized for many years. The name "su-aurù" means "water disease," it being held to be due to the drinking of dirty water. It has also been said to be caused by a certain kind of grass.

One of the most characteristic symptoms is swelling of the inferior cervical lymphatic glands, although it is difficult to ascertain the size of these when they are normal. A subacute and a chronic form of the disease are recognized.

Experiments indicated that the disease in the horse and camel were identical.

In experimental infections the period of incubation ranges from 2 to 10 days, depending upon the amount of virus used and the species of animal from which it is taken. The course of the disease is usually rapid and death takes place after a short time. A painful swelling generally develops at the seat of inoculation, and this persists for three or four days. It was never found possible to detect trypanosomes in the enlarged glands prior to their appearance in the blood stream. Daily examinations of the blood showed that trypanosomes persisted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there from the time of their appearance until death took place. The original swelling of the cervical glands was very marked, but this was soon reduced in amount, but there was some degree of permanent swelling left. In experimentally-infected camels there was not always observed oedema. In all cases purulent conjunctivitis was observed. At the post-mortem examination of experimentally-infected camels no very distinct lesions were found.

ILOVAISKY (S.). **Su-auru der Pferde.** [Su-auru in the Horse.]—*Arch. f. Schiffs- u. Tropen-Hyg.* 1924. Dec. Vol. 28. No. 12. pp. 535–538.

In the first case of the disease—a trypanosomiasis of camels and horses in Kirghiz and Ural—the only symptoms observed were diarrhoea and wasting, and nothing at all indicative of trypanosomiasis. Investigations carried out in 1923 shewed that the percentages of camels and horses infected were 8·82 and 4·25 respectively in Kirghiz, but in the Ural area these percentages were 28·6 and 70·7.

As a result of extensive investigations the author formed the following views regarding su-auru in horses. The course of the disease is divisible into two distinct periods, and it is only during the second of these that definite symptoms are presented. The symptoms are: wasting, irregular fever, purulent conjunctivitis and keratitis, and jaundice. Oedema is not observed as a rule. The disease runs its course in six months to a year, and spontaneous recovery does not appear to take place. The disease appears to be distinct from surra.

WALRAVENS (P.). **Note concernant des cas de trypanosomiase chez le porc produits par le** *Trypanosoma rodhaini* **(n.sp.).** [Cases of Trypanosomiasis in Pigs caused by *T. rodhaini* (n.sp.).]—*Rev. Méd. de Angola.* (No. especial 1e Congresso de Med. Trop. da Africa Ocidental. Vol. 4.) 1923. Aug. No. 4. pp. 233–234.

The author describes a trypanosome found in the blood of pigs near Elizabethville in September, 1922.

The parasite was found to be incapable of infecting guineapigs and rabbits, but it was transmitted to a young pig.

The organism was distinguishable from *Cazalboui-vivax* morphologically and on the score of its feeble motility, which involved little or no translation. It appeared to differ from *T. simiae* by the invariable presence of a long free flagellum.

SERGENT (Edm.) & DONATIEN (A.). **Debab et nagana chez le dromadaire.** [Debab and Nagana in the Dromedary.]—*Arch. Inst. Pasteur d'Algérie.* 1924. June. Vol. 2. No. 2. p. 162.

In a brief note the authors describe two experiments in which two dromedaries were inoculated with MESNIL'S strain of *T. brucei*. Both of these animals had previously been infected with Debab. One had apparently made a complete recovery, while the other occasionally showed trypanosomes in its blood. Both animals showed febrile

attacks after a period of five or six days, and trypanosomes appeared in the blood in considerable numbers.

The authors conclude that the trypanosomes are not identical, and also that the North African dromedary is susceptible to nagana.

SERGENT (Edm.), DONATIEN (A.), & DEGUILLAUME (A.). **Notes sur le Debab, trypanosomiase des dromadaires : évolution, influence sur la gestation, prémunition.** [The Evolution of Debab and its Influence on Gestation in the Dromedary. Immunization.]—*Arch. Inst. Pasteur d'Algérie.* 1924. June. Vol. 2. No. 2. pp. 147–157.

During the incubative stage of infection abortion may occur, but in the acute stage abortion or the slipping of a dead foal always occurs. During the chronic phase accompanied by immunization (prémunition) foaling may be normal, but in some cases the foal dies.

The degree of immunity acquired protects dromedaries from re-infection, but it is not hereditary.

SERGENT (Edm.) & DONATIEN (A.). **Existence aux confins algéro-marocains de l'infection équine due à *Trypanosoma marocanum* et considérations, à ce propos, sur l'épreuve des réinoculations croisées de Laveran et Mesnil.** [An Equine Infection in Morocco and Algeria due to *T. marocanum* and the Bearing of this upon the Cross-Immunity Test of Laveran and Mesnil.]—*Arch. Inst. Pasteur d'Algérie.* 1924. June. Vol. 2. No. 2. pp. 158–161.

The trypanosome was obtained for the experimental work from a guineapig inoculated from an infected horse in the Oudjda area.

A sheep was infected with *T. marocanum*, and by means of treatment with tartar emetic it was brought through the infection. The blood was infective for dogs up to 7 months after, but not at 13 months. Four months later it was given a second inoculation of virus. The sheep showed no clinical evidence of infection, but its blood was proved by the inoculation of dogs to contain trypanosomes. The sheep was therefore " prémunised " but not immunized. A third injection of virus was given seven months after the second. The blood failed to infect two dogs inoculated 24 days later. The sheep was now immune to the *T. marocanum*. Two months later it was injected with the Oudjda virus, but it failed to become infected. A second injection was given four months later. After this two dogs inoculated from it failed to become infected.

A parallel experiment was carried out with a goat.

In a third experiment a sheep was immunized against the Oudjda virus, and then inoculated with *T. marocanum*. The inoculation failed to infect.

The conclusions drawn are : That the trypanosomes occurring in horses in Eastern and Western Morocco are identical ; that it is wise in experiments of this kind to repeat the inoculations conferring the first immunity so as to make sure that the condition of " prémunition " is passed, and that of actual immunity established, before the cross test is carried out.

Sheep and goats, which are less susceptible to trypanosomiasis than the dromedary, may pass through the successive phases of infection and prémunition, and achieve complete immunity. The last of these is acquired in about two years. Its duration is not known.

LETONTURIER, DE MARQUEISSAC, & JAMOT. **La prophylaxie de la maladie du sommeil au Cameroun dans les secteurs du Haut Nyong et de Doumé.** [Sleeping Sickness Prophylaxis in the Cameroons.]—*Ann. Inst. Pasteur.* 1924. Dec. Vol. 38. No. 12. pp. 1053–1100.

Haut-Nyong and Doumé have been sleeping sickness centres for many years, and it is exceptionally contagious on account of the density of the population. There is little tendency to regression save in one area of the Doumé district, where it has practically disappeared. While the disease is not so fatal as in some parts of equatorial Africa, it is a serious factor in depopulation.

In dealing with the disease prophylactically detailed information is essential, and this can only be obtained by complete investigations in all the endemic or suspected areas. When the areas have been definitely located they must be circumscribed. All movement must be carefully controlled, and the infected must be prevented from going to clean areas.

Examination by lumbar puncture shows that approximately half the infected are in the first stage of the disease, and therefore curable. Efforts should be concentrated upon these cases, but to achieve success the work must be carried on assiduously for many years.

BATTAGLIA (M.). **Metodo per colorare i tripanosomi nei tessuti fissati.** [The Staining of Trypanosomes in Fixed Tissues.]—*Pathologica.* 1925. Jan. 1. Vol. 17. No. 387. p. 23.

The sections are stained for two hours in carbol gentian violet and then passed into iodine solution (Gram's) where they remain for an hour. Decolorization is then effected by absolute alcohol.

VELU (H.), BAROTTE (J.), & LAVIER (G.). **Le Bayer 205 dans la thérapeutique des trypanosomoses animales au Maroc.** [" Bayer 205 " in the Treatment of Animal Trypanosome Infections in Morocco.]—*Ann. Parasit. Humaine et Comparée.* 1925. Jan. Vol. 3. No. 1. pp. 1–11.

The bulk of this paper is made up of detailed accounts of animals subjected to treatment with " Bayer 205." Two animals—a horse and a dog—were inoculated experimentally with *T. marocanum.*

The dog, which weighed 2·5 kilogs., was given two injection of 0·5 g. of the drug 7 weeks and 10 weeks after it was inoculated and when infection was well established. Recovery took place.

The horse, which had been treated for dourine, and had made an apparent but not an actual recovery, was also inoculated with *T. marocanum.* It received a dose of 5 g. six weeks after inoculation. During the next six months the animal wasted a great deal and a month later trypanosomes were found in the blood. Two doses of " Bayer 205 " (5 g. and 2 g., at an interval of 24 hours) failed to effect a cure, and death took place. Six naturally contracted cases of dourine were treated. Seven grammes of the drug were given intravenously in two doses, at an interval of 48 or 72 hours. Three animals

showed toxic symptoms, and one died. In two instances the occurrence of oedema intermittently made it doubtful whether recovery had actually taken place, and in one case there was apparently a complete cure.

VELU (H.), BAROTTE (J.), BALOZET (L.), & LAVIER (G.). **Au sujet d'accidents consecutifs aux injections de Bayer 205 chez des étalons dourinés.** [Ill-Effects noted in Stallions infected with Dourine as the Result of Treatment with "Bayer 205."]—*Ann. Parasit. Humaine et Comparée.* 1925. Jan. Vol. 3. No. 1. pp. 12–20. With 1 text fig.

The stallion which died (see above) developed oedematous swellings on all parts of the body, ranging from a nut to an egg. They resembled in appearance the generalized subcutaneous sarcomata seen in horses, although they were softer to the touch. Oedema was particularly marked over the parotid region and lips, nares, and chin. The symptoms in the non-fatal cases were similar, but less pronounced. After the lapse of 36 to 48 hours the patches of oedema disappeared and gave place to erythema. Prostration was very marked, and the animals showed an intense desire to bite such parts as they could reach. In some cases a papular or vesicular eruption occurred. There was no rise of temperature. Appetite was entirely lost, and the animal became reduced to a skeleton. Bed sores developed rapidly. At the post-mortem the muscular tissue had the appearance of "fevered flesh." The liver was slightly enlarged, of a pale yellow colour, and was readily torn. The other organs showed only marked congestion of the vessels. The blood was imperfectly coagulated. The congestion of the vessels was the most striking feature.

This lesion led the authors to try the effect of subcutaneous injections of adrenalin. Twelve cubic centimetres were given in the evening after the "205" had been given in the morning, and three further injections of 10 cc. were given morning and evening. One stallion which recovered developed a curious lesion : this was an elongated area of oedema running down from the croup towards the hip in a symmetrical manner on each side. These areas were observed in the morning and gradually became less marked during the day. This was observed daily, but becoming increasingly indistinct for about a week. Subsequently there was an abundant desquamation of epithelium over these areas, and a growth of white hairs.

The authors review at some length the possible explanations of the toxic effects of the drug in these cases.

ILOWAISKY (S. A.) & ZEISS (H.). **"Bayer 205" bei experimentalem Su-aurù von Kamelen.** ["Bayer 205" in the Treatment of Experimental Su-aurù in the Camel.]—*Rev. Microbiol. et Epidémiol.* 1923. Vol. 2. No. 1/2. p. 95.

This brief note is in the nature of a preliminary publication regarding the use of "Bayer 205" in camels affected with Su-aurù. In one instance a single intravenous injection of 3 grammes of the drug appeared to effect a complete cure, as the animal was kept under observation for five months in apparently perfect health. In another animal a relapse occurred one month after the first dose, but this was cut short by a second dose of 3 grammes.

For naturally-infected animals it is suggested that a first intravenous injection of 2–3 grammes should be given, followed by a second of 4 grammes subcutaneously after an interval of 8–10 days.

VAN SACEGHEM. **Le 205 Bayer (Naganol) et le traitement des Trypanosomiases animales.** ["Bayer 205" and the Treatment of Animal Trypanosomiases.]—*C. R. Soc. Biol.* 1924. Dec. 27. Vol. 91. No. 37. pp. 1452–1454.

Injections of "Bayer 205" render the blood incoagulable. The fatal toxic dose for cattle is 15 grammes per 100 kilog. live weight. At the post-mortem the principal lesions are found in the intestine and kidneys. In the treatment of sleeping sickness in man the use of the drug leads to improvement if it be used during the first or second stages, but it is not yet established whether a radical cure is effected. In the third stage of the disease no results are obtained.

In animal trypanosomiases the drug is valueless against *T. vivax*; of little or no value in equine surra. Dourine and mal de caderas may be favourably influenced by it.

Van Saceghem has tested it against *T. congolense*, but has not had very encouraging results.

The sample of the drug used was of a pink colour which, when dissolved slowly in distilled water (to make a 20 per cent. solution), yielded a pink solution which subsequently became dark red. All injections were made intravenously.

Animals infected experimentally with *T. congolense* were given the drug at the rate of 5 grains per 100 kilog. This produced a temporary clearing of the circulation, which lasted at the most for four weeks. Tolerance to the drug is readily established. When used for the treatment of animals infected with *T. vivax* in the same dose the circulation was cleared of trypanosomes for a maximum of seven days only.

SMILLIE (W. G.). **The Treatment of Mal de Caderas with Tryparsamide.**—*Jl. Amer. Vet. Med. Assoc.* 1923. Sept. pp. 19–33. With 3 text figs.

Mal de Caderas is the biggest economic problem of the Paraguay Valley. In some places ranches lose the whole of their horses each year.

Mules are less susceptible, and may recover, but it is said that no horse which has developed paresis ever recovers. It is believed that the disease is transmitted in Brazil by the tabanid *Lepidoselaga lepidota*. Variable results have been obtained with "Bayer 205." MIGONE reports encouraging results, but in Upper Paraguay it is found that the drug is toxic in effective doses (3 g. intravenously). Smillie has had the opportunity of trying tryparsamide on a ranch where the disease occurs endemically in its severest form. Owing to difficulties of transport in Western Brazil it was possible to study the effects of single doses given to a few cases at widely separated places.

Diagnosis was based upon the examination of a few drops of liquid from the leucocyte layer obtained by centrifuging citrated blood in a hand centrifuge for three minutes. No specimen was considered negative until it had been searched fruitlessly for half-an-hour.

Doses of 5 grammes to 8 grammes of the drug were dissolved in 20 cc. of normal saline and injected intravenously.

Details are given of the various animals treated.

The transmitting fly is prevalent during the period November to February, and as the author's tour was made in March and April only a few were seen. He formed the opinion that the fly is not a carrier of the infection from season to season, but acts as the transmitting agent during the hot weather. He does not think that the capybara acts as the reservoir for the virus for the reason that this animal inhabits the river banks, while horses are on upland pastures many miles from the rivers. He believes that the horse, and possibly also the mule, are the reservoirs of the virus.

The disease appears to pass through two phases. In the earlier phase there is invasion of the blood. There may be fever and some loss of weight, but the animal continues to work. At this phase there is a chance of effecting a cure, and it is this phase which is the chief source of danger.

The second phase is marked by invasion of the nervous system, and the development of paralysis. This phase is not of importance either from the prophylactic or the curative point of view. In this phase parasites have largely disappeared from the circulating blood, and the animals are therefore not a source of danger to the rest. Control depends upon early diagnosis, as horses may be infected for weeks or months during the slack season, but, nevertheless, they may show no symptoms until the stress of work is brought into play.

Two plans are suggested for the control of the disease.

A. Microscopic examinations of the blood of all horses between December and January each year. Place infected animals on short-grass pasture. The temperatures of all apparently healthy horses should be taken every fortnight from January 1st, and all animals showing a temperature of 102° to be subjected to another blood examination. Temperature taking to be continued until April 1st.

Infected animals to be given (intravenously) 8 to 10 g. of tryparsamide at intervals of 2 to 3 weeks. Healthy and treated horses may be brought to work with healthy animals from April 15th onwards. The difficulty of this plan is the necessity for skilled assistance in making the microscopic examinations.

B. The second plan, which obviates the necessity of microscopic examinations, is as follows :—

The temperature of all horses to be taken by December 15th. Animals showing a temperature of 102° or over to be isolated as suspicious. The temperature of these animals to be taken daily for five or six days. If the fever persists treatment should be resorted to. The temperatures of all horses to be taken once a fortnight, and all animals showing a rise to be treated as above.

Additional measures of a general nature are as follows :—

New horses should be bought from upland Caderas-free areas. It is unnecessary to carry out destruction of the capybara.

Horses should be kept away from brush and should be placed on short-grass pastures during the rainy season.

In the author's experiments it was found that 24 horses treated with two doses were still alive and well after nine months, while five untreated controls were all dead. No toxic effects were noted ; there was, in fact, a general improvement in condition.

Treatment is of very doubtful value once the nervous system has become involved.

CURSON (H. H.). **Nagana and the Tartar Emetic Treatment.**—*Jl. Dept. Agric. Union of South Africa.* 1924. Oct. Vol. 9. No. 4. pp. 363–369. With 1 plate.

After dealing briefly with the nature, symptoms and course of the disease, the author gives a more detailed account of the methods employed in treatment with tartar emetic :—

Adult cattle may be given 1·5 grammes daily for 5 days.

Horses, mules and donkeys may also be given doses of 1·5 grammes.

Dogs of 25 lb. weight may be given 100 to 125 mg. with safety.

Discretion must be used with regard to repetition of the dose. The drug is given as a 5 per cent. solution in water, and for large animals the jugular vein is selected. In dogs, the saphena vein is the vessel of choice.

Care must be exercised that none of the drug is placed under the skin, as suppuration will occur.

It is to be noted that the author groups together infections caused by *T. brucei*, *T. congolense*, and *T. vivax* as nagana, and that tartar emetic appears to be valueless for the treatment of *T. brucei* infection.

SERGENT (Edm), DONATIEN (A.), PLANTUREUX (E.), & DEGUILLAUME (A.) **Essais de traitement du Debab trypanosomiase des dromadaires. (3me Mémoire.)** [The Treatment of Debab in Dromedaries.]—*Arch. Inst. Pasteur d'Algérie.* 1924. June. Vol. 2. No. 2. pp. 166–177.

The authors give details of a considerable number of experiments in which emetic, atoxyl, either alone or in conjunction, novarsenobenzol, Product No. 189, trepol, oxycyanide of mercury, biniodide of mercury, salicylate of soda, sulphate of copper, and quinine were used.

As it is impracticable to make an abstract of the mass of figures given that would be of any value, the authors' conclusion may be quoted :—

The following drugs have been found to be very active against *T. berberum*, intravenous injections of a watery solution of emetic, and a combined method using emetic and atoxyl. In a single case an intramuscular injection of emetic in oil gave a result inferior to that given by the intravenous injections of watery solutions (7 cases). In two cases atoxyl was proved to be active, but the safety factor is too low. Novarsenobenzol appears to act like atoxyl, but is less toxic.

The following were found to be inefficacious : 189 (1 case), trepol (2 cases), oxycyanide of mercury (1 doubtful success out of two cases treated), biniodide of mercury (7 cases), salicylate of soda (2 cases), sulphate of copper (2 cases), and quinine (1 case).

GALLIARD (Henri). **Sur un cas d'infection à *Trypanosoma theileri* et *Piroplasma bigeminum*.** [A Case of Infection with *T. theileri* and *P. bigeminum*.]—*Ann. Parasit. Humaine et Comparée.* 1925. Jan. Vol. 3. No. 1. pp. 21–27. With 1 text-fig.

The trypanosome made its appearance in the blood of a cow inoculated experimentally with blood containing *P. bigeminum*, *P. argentinum*, and *Anaplasma marginale*.

NOGUCHI (H.) & LINDENBERG (A.). **The Isolation and Maintenance of Leishmania on the Medium employed for the Cultivation of Organisms of the Leptospira Group of Spirochetes.**—*Amer. Jl. Trop. Med.* 1925. Jan. Vol. 5. No. 1. pp. 63–67. With 1 plate.

Two strains of *Leishmania brasiliensis* have been isolated from lesions by cultivation in the following medium :—

0·9 per cent. saline	800 parts
Fresh rabbit serum	100 ,,
2·0 per cent. nutrient agar pH 7·2	100 ,,
Rabbit haemoglobin, made by laking 1 part of defibrinated blood with 3 parts of distilled water	10–20 ,,

The primary tubes were kept (through force of circumstances) for three weeks before subcultures were made. Sterile oil may be placed upon the surface of the medium to prevent evaporation. Primary tubes at room temperature yielded growths, but tubes kept at 26° C. failed.

HEUSER (G. F.). **Influence of Vitamines on Growth and Resistance to Coccidiosis.**—*Rel. Poultry Jl.* 31 (1924), No. 2. pp. 226, 228 & 232. [Ex. *Experiment Station Record.* 1924. Oct. Vol. 51. No. 6. p. 576.]

Experiments carried out with chicks led the author to the opinion that the addition of cod liver oil, green food and milk (skimmed) caused a great increase in weight and exalted the resistance of the chicks to coccidiosis.

NIESCHULZ (O.) **Zur Verbreitung von Isospora-Infektionen bei Hunden und Katzen in den Niederlanden.** [Isospora Infections of Dogs and Cats in Holland.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1925. Jan. 28. Vol. 94. No. 2. pp. 137–141. With 3 text-figs.

Nieschulz has examined the faeces and intestinal wall of 50 cats and 35 dogs for oocysts by Vajda's glycerin concentration method. *Isospora bigemina* was found in 1 cat, *I. rivolta* in 6 dogs and 6 cats, *I. felis* in 7 cats, and in 1 dog sporocysts of what is possibly a new species of Isospora.

In the latter case ripe free sporocysts were found in small numbers. These measured 14–17μ by 8–10μ. The spore membrane was double-contoured.

The dog had been dead one day before it was examined.

PÉRARD (C.). **Recherches sur les coccidies et les coccidioses du lapin.** [The Coccidia of the Rabbit.]—*Ann. Inst. Pasteur.* 1924. Nov. Vol. 38. No. 11. pp. 953–976.

As the result of his observations and experiments the author concludes that there are two coccidia commonly parasitic in the rabbit, *Eimeria perforans* which is responsible for the intestinal disease, and *E. stiedae*, which is the cause of hepatic coccidiosis. *E. perforans* measures on an average 25·5 by 15·5μ, and *E. stiedae* 37·5 by 21·5μ.

DE KOCK & QUINLAN. **A Short Preliminary Communication on Anaplasmosis of Sheep as observed in South Africa.**—*Bull. Soc. Path. Exot.* 1924. Oct. Vol. 17. No. 8. pp. 651–653.

Sheep at Onderstepoort subjected to splenectomy showed relapses to anaplasmosis with fever, icterus, and fairly acute anaemia.

Sheep from the Orange Free State showed no such relapses.

Anaplasmosis has been found as an independent specific disease in the sheep, and it has been maintained through six generations in sheep. It has been found impossible to transmit the infection from sheep to cattle by inoculation.

Similarly, experiments in which attempts were made to transmit bovine anaplasmosis to sheep have failed.

TORRES (C. M.). **Coccidiose, lésions de la moelle osseuse et réaction de Wassermann positive, non-spécifique, chez le lapin.** [Coccidiosis ; Lesions of the Bone Marrow and Non-Specific Wassermann Reaction.]—*C. R. Soc. Biol.* 1924. Oct. 31. Vol. 91. No. 30. pp. 986–987.

The author has examined a number of rabbits and finds a positive Wassermann reaction has no connexion with the existence of coccidiosis, as has been suggested, nor with oedema of the bone marrow. Oedema of the bone marrow with atrophy of the adipose cells is sometimes seen in rabbits. This in its turn is not connected in any way with coccidiosis.

SCHMIDT (J.). **Kokzidienbefunde bei Tieren und ihre Deutung.** [The Importance of Coccidia in Animals.]—*Berlin. Tierärzt. Wochenschr.* 1924. Dec. 26. Vol. 40. No. 52. pp. 753–755.

The author and his co-workers have examined the faeces of sheep, lambs and goats, and they find that apparently healthy animals may pass coccidia. They also find that oocysts are not invariably passed by animals harbouring the parasite.

GILBERT (S. J.). **A Case of *Theileria mutans* Infection (Egyptian Fever) in Palestine.**—*Jl. Comp. Path. & Therap.* 1924. Sept. Vol. 37. No. 3. pp. 158–160.

The infection occurred in a Dutch bull 2½ years old, which was born in Palestine, at Benyamina, in the northern part of the coastal plain. The principal ticks found are *B. annulatum* and *H. aegyptium*. Cases of *bigeminum* infection and anaplasmosis have been found in imported cattle there.

The symptoms noted were loss of appetite, feebleness of pulse and accelerated respiration. The temperature rose to 42° C., and there was lachrymation and enlargement of the lymphatic glands. Constipation yielded to treatment. There was no jaundice, but red urine was observated on two occasions. Death occurred on the 13th day after symptoms were first noticed.

Five grammes of trypanblue were given subcutaneously on the first day of illness and 2 grammes intravenously on the 11th day.

At the post-mortem examination the mucous and serous membranes were deeply stained with trypanblue. The carcase was oedematous. The blood clotted feebly and slowly. The duodenum contained a quantity of dark yellow fluid. The abomasum showed a number of erosions. The kidneys showed no infarcts, but were intensely stained

with trypanblue. The spleen was somewhat enlarged, reddish brown in colour and soft. There was pericarditis, and the pericardium contained about a pint of fluid. The lungs were oedematous and the bronchi contained frothy mucus.

Parasites were first seen in the blood on the 3rd day. A smear obtained on the 11th day showed about 50 per cent. of the corpuscles invaded. Multiple invasion up to 4 parasites was seen. Round forms slightly predominated. About 10 per cent. were bacillary and a few cross forms were found. Cross forms were found in smears from the spleen and plasma bodies were identified in smears from glands, but none were found in the blood.

At the time there were 20 other imported cattle or their progeny in the building, but none became infected. The previous case of tick infection in this dairy had occurred two months earlier. This animal recovered. A few parasites resembling *Theileria mutans* were found in the blood.

DE MELLO (Froilano), with REBELLO (F.), PAES (S.), & D'ALMEIDA (C.). **Première contribution à l'étude des piroplasmidés de la province d'Angola.** [First Contribution to the Study of Piroplasmidae in Angola.]—*Revista Méd. de Angola.* (No. especial 1e Congresso de Med. Trop. da Africa Ocidental. Vol. 4.) 1923. Aug. No. 4. pp. 517–525. With 1 plate in colour.

This publication is a classification of the Piroplasmidae.

DE MELLO (F.). **Deuxième contribution à l'étude des piroplasmidés de la province d'Angola.** [Second Contribution to the Study of the Piroplasmidae in Angola.]—*Revista Méd. de Angola.* (No. especial 1e Congresso de Med. Trop. da Africa Ocidental. Vol. 4.) 1923. Aug. No. 4. pp. 539–543. With 1 plate in colour.

A small piroplasm found in blood smears from four cattle is figured and described. Pear-shaped, bacilliform, dividing forms and cross-shaped parasites were encountered. There were also crescentic forms which the author considers to be gametes, anaplasma-like forms and parasites which he considers to be transitional between anaplasms and piroplasms. In a short note the occurrence of a parasite of the bigeminum type is recorded. It was found in the blood of an ox which had recovered from redwater.

DE MELLO (F.) & CABRAL (E.). **Troisième contribution à l'étude des piroplasmidés de la province d'Angola.** [Third Contribution to the Study of the Piroplasmidae in Angola.]—*Revista Méd. de Angola.* (No. especial 1e Congresso de Med. Trop. da Africa Ocidental. Vol. 4.) 1923. Aug. No. 4. pp. 547–549. With 1 plate in colour.

This short paper contains observations on the morphology of piroplasms found in sheep.

The observations were made on four blood smears, and the conclusion is arrived at that the parasite was *Gonderia mutans.*

The authors have found a similar parasite in very small numbers in the blood of 2 out of 12 apparently healthy sheep.

Ring-shaped, pear-shaped, dividing forms, anaplasma-like forms, transitional forms and gametes are described.

DE MELLO (F.), REBELLO (F.), PAES (S.), & D'ALMEIDA (C.). **Sur un piroplasmide parasite du** *Bos brachycerus* **d'Angola.** [A Piroplasma of *Bos brachycerus* in Angola.]—*Revista Méd. de Angola.* (No. especial 1e Congresso de Med. Trop. da Africa Ocidental. Vol. 4.) 1923. Aug. No. 4. pp. 527–529. With 1 plate in colour.

Pyriform, rounded, twin, cross forms, bacilliform, oval, crescentic shapes are figured and described. In smears from the muscles and liver large schizonts were found, but it was not possible to make out whether these forms were enclosed in blood corpuscles or not.

The parasite is provisionally named *Piroplasma* (*Achromaticus*) *brachyceri.*

DE MELLO (Froilano) & REBELLO (Frederico). **Anaplasmose du** *Bos brachycerus* **d'Angola.** [Anaplasmosis of *Bos brachycerus* in Angola.]—*Revista Méd. de Angola.* (No. especial 1e Congresso de Med. Trop. da Africa Ocidental. Vol. 4.) 1923. Aug. No. 4. pp. 531–532. With 1 plate in colour.

The blood contained a considerable number of parasites, as one or two invaded corpuscles were to be found in every field of the microscope. The parasites were centrally or peripherally placed in the cells and were surrounded by a pale halo. The blood showed no changes. Free forms were seen.

DE MELLO (F.) & PAES (S.). **Morphologie et cycle schizogonique d'un Piroplasmidé, parasite d'une chèvre de Calumbo.** [The Morphology and Schizogonic Cycle of a Piroplasm of a Goat at Calumbo.] —*Revista Méd. de Angola.* (No. especial 1e Congresso de Med. Trop. da Africa Ocidental. Vol. 4.) 1923. Aug. No. 4. pp. 533–536.

The authors examined the blood of the goat prior to death, and saw what they believed to be piroplasms. During the transport of the sick animal to Loanda it died, and the post-mortem examination revealed dilatation of the stomach, petechiae on the abdominal wall, intense congestion of the liver, enlargement of the spleen, pericarditis. Smears were made from the organs and from the blood. Parasites were found in the latter only.

There was evidence of marked anaemia, and more than 20 per cent. of the corpuscles contained parasites. These were markedly polymorphic.

The parasite was classified as *Gonderia ovis* (Babes) 1892 *emend.* Sergent.

STUART (G.), KRIKORIAN (K. S.), & GILBERT (S. J.). **Note on the Occurrence of Anaplasmosis in Palestine.**—*Jl. Comp. Path. & Therap.* 1924. Sept. 30. Vol. 37. No. 3. pp. 149–154. With 2 text-figs & 1 chart.

The authors place on record the occurrence of a case of anaplasmosis in Palestine, and also the experimental transmission of the disease to a calf.

For some time previously a disease resembling gall sickness had come under notice, but a definite diagnosis had not been established.

The disease was definitely diagnosed in a Beyrout cow imported into Palestine. The symptoms were fever, marked jaundice, loss of appetite, acceleration of pulse and respiration, but there was no haemoglobinuria.

The frequency of the parasite in the blood films is not mentioned, but it is stated that the blood corpuscles showed evidence of severe anaemia.

A native-born calf was purchased for experimental infection, and kept quite free of ticks. This animal was inoculated with 10 cc. of citrated blood from the cow. The calf's blood was carefully examined prior to inoculation, but no evidence of infection could be found. Anaplasma was first found in the blood 21 days after inoculation, and five days before there was any rise of temperature, and they were most numerous for a few days just before the temperature rose. They were scanty during the period of fever (a week). Mast cells were found in the blood for about a week before the parasite appeared.

The clinical symptoms were very inconspicuous.

VAN SACEGHEM (R.). **Les Theilérioses. Note préliminaire.** [The Theileriases. Preliminary Note.]—*Bull. Soc. Path. Exot.* 1924. Oct. Vol. 17. No. 8. pp. 637–639.

Van Saceghem states that the disease described by SERGENT as being caused by *Theileria dispar* n.sp. occurs in Ruanda (E. Africa) and Kivu (Belgian Congo). He states, however, that, contrary to what is held to be the case by SERGENT, he has encountered chronic forms of the disease. He believes that the disease described by SERGENT is identical with that described by BRUMPT as being caused by *Th. mutans*.

The whole question of East Coast fever requires revision, and the view is put forward that the diseases caused by *Th. dispar* and *Th. mutans* are merely forms of a single disease, East Coast fever.

PLANTUREUX (Edm.). **Au sujet de la " formol-gélification " chez les dromadaires et chez les bovidés.** [The " Formol-Gel " Test in Dromedaries and Cattle.]—*Arch. Inst. Pasteur d'Algérie.* 1924. June. Vol. 2. No. 2. pp. 163–165.

Technique.—Clear, unheated sera only have been used, and on the day following the withdrawal of blood.

Twenty drops of serum were placed in tubes, and to these were added 1, 2, and 4 drops of " formol."

The samples were taken from bulls imported from France for experimental work, and ranging in age from 8 to 20 months. Of 14 animals which were healthy two gave positive reactions. Of 11 infected with piroplasmosis and 2 infected with anaplasmosis, 8 gave positive reactions.

The test cannot be relied upon for the detection of piroplasmoses in cattle.

CLARK (H. C.) & ZETEK (J.). **Tick Biting Experiments in Bovine and Cervine Piroplasmosis.**—*Amer. Jl. Trop. Med.* 1925. Jan. Vol. 5. No. 1. pp. 17–26.

Margaropus annulatus australis and *Amblyomma cayenense* are found on cattle and deer in Panama. White-tailed deer (*Odocoileus chiriquensis*) have been found to harbour piroplasms, and the progeny

of ticks from one such infected deer caused a mild attack of piroplasmosis when placed on a half-bred calf. In an experiment of the reverse kind a mild attack of piroplasmosis was set up in a brocket deer (*Mazama sartorii reperticia*) by seed ticks of *Margaropus annulatus australis* from an ox.

The results appear to suggest that deer may act as reservoirs for cattle piroplasmosis.

BELITZER (A.). **Epizootie und Prophylaxis der Piroplasmose der Pferde, hervorgerufen von** *Babesia caballi*. [Epizootiology and Prophylaxis of Equine Piroplasmosis caused by *Babesia caballi*.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1925. Jan. 20. Vol. 94. No. 1. pp. 51–56.

Both types of equine piroplasmosis occur in Russia. That caused by *B. caballi* is found in Central and Southern Russia, while that due to *Nuttallia equi* is found in the south only. The former is transmitted by *Dermacentor reticulatus*, and the latter, in all probability, by *Hyalomma aegyptium*.

The disease has a seasonal and regional distribution. It occurs as an epizootic in May and June and isolated cases occur in September and October. The larvae and nymphs of *Dermacentor reticulatus* do not transmit the disease.

The adult ticks attach themselves during April and May. The larvae and nymphs appear to pass the summer months on small rodents. During the autumn the mature ticks appear, but these are not active, and only attach themselves to the large animals in very small numbers.

The disease is of great economic importance, as the animal loss is very heavy. On an average, 30 to 40 per cent. of affected animals die. Young animals do not suffer as severely as adults, but all are susceptible to infection.

Trypanblue does not effect a complete cure. In spite of the severity of the disease clinical recovery takes place very rapidly.

ROSENBUSCH (F.) & GONZÁLEZ (R.). **Garrapatizacion y Tristeza.** [Ticks and Tristeza.]—*Revista Med. Vet.* Dec. 1923 & Jan. 1924. Vol. 6. Nos. 15 & 16. pp. 683–703.

The common tick of the sheep (*Boophilus microplus*) transmits both piroplasmosis and anaplasmosis. The infectivity of the tick depends upon the external termperature.

In the spring ticks are not, as a rule, infective, but they become so when the temperature reaches 29° C.

Anaplasmosis is transmitted only when the temperature exceeds 34° C.

Since the temperature at Buenos Aires is moderate piroplasmosis alone is generally set up in experiments.

Immunity conferred by inoculation does not protect against infection carried by ticks, and that conferred by ticks is only effective in the same area. It does not confer protection against infection by ticks in other parts.

Anaplasmosis is not transmitted either by Haematopinus or by Amblyomma, nor by ingestion.

The infection is carried from generation to generation of the ticks in the case of both diseases.

LIGNIÈRES (J.). **Nouvelles preuves de l'inoculation de l'Anaplasma du boeuf au mouton, puis du mouton au mouton. Comparaison des résultats obtenus avec ceux publiés par l'Institut Pasteur d'Algérie.** [New Proofs of the Transmissibility of Anaplasma from the Ox to the Sheep and from Sheep to Sheep. Comparison of Results obtained with those of the Pasteur Institute, Algiers.]—*Bull. Soc. Path. Exot.* 1924. Oct. Vol. 17. No. 8. pp. 647-651.

Details are given of a number of inoculations of adult Lincoln sheep with anaplasma. Young animals are less susceptible. Inoculated sheep show no evidence of infection, and the parasite cannot be found in their blood, but its persistence can be proved even after a number of passages by the inoculation of bovines with the blood of the last sheep of a series. This has been proved up to 7 passages through sheep lasting 2 years altogether.

These results are very different from those obtained in Algeria, and the significance of the difference is not yet known. Cross immunity experiments are necessary.

LIGNIÈRES (J.). **Démonstration en France de la réceptivité des ovins à l'*Anaplasma argentinum*, par injection à des bovidés, du sang d'un mouton apporté de Buenos Ayres. Quelques réflexions sur les résultats obtenus.** [Demonstration in France of the Susceptibility of Sheep to *A. argentinum*, by the Injection of Cattle with the Blood of a Sheep imported from Buenos Ayres.]—*Bull. Soc. Path. Exot.* 1924. Oct. Vol. 17. No. 8. pp. 642-647.

In 1923 Lignières brought over to France two sheep which had been inoculated with anaplasma from a bovine. One was a first passage inoculation, and the other a fourth passage in sheep.

With blood from these animals bovines were inoculated successfully in France. It was noted that the Breton race of cattle used in these experiments presented a greater degree of resistance than shorthorns and Herefords in the Argentine. In using anaplasma which has been passed through sheep for the immunization of cattle, resistant breeds may be inoculated with the first or second sheep passage of the parasite, while susceptible animals should be inoculated with blood from sheep of the sixth or seventh passage.

LESTOQUARD (F.). **Deuxième note sur les Piroplasmoses du mouton en Algérie. L'anaplasmose : *Anaplasma ovis*. nov. sp.** [Second Note on Piroplasmosis in Sheep in Algeria. *Anaplasma ovis*. n.sp.]—*Bull. Soc. Path. Exot.* 1924. Nov. 12. Vol. 17. No. 9. pp. 784-788.

Infection of sheep with anaplasms exists in addition to infections with *Babesiella ovis*, *Gonderia ovis*, and *Theileria ovis* previously described.

The parasite may be marginal, sub-marginal or central in position and is responsible for a disease the essential character of which is an anaemia. The condition is transmissible by inoculation and the

period of incubation varies from 8 to 40 days, with an average of 25. Parasites may appear before or after the first rise of temperature, and the duration of fever is irregular. About 7 per cent. of the corpuscles may be invaded; and the parasites may be discovered in the blood after the temperature has fallen. The loss of corpuscles may be from 5 to 10 million per cmm. That is, a drop from 12 to 15 million to 5 to 6 million. *Anaplasma ovis* is transmissible to the goat.

Attempts to cultivate the parasite have failed; although multiplication of the parasite has been observed in the primary tubes, subcultivation has failed.

FRANCHINI (G.). **Observations sur les hématozoaires des oiseaux d'Italie (2e note).** [The Haematozoa of Birds in Italy.]—*Ann. Inst. Pasteur.* 1924. June. Vol. 38. No. 6. pp. 470–515.

The author has examined 186 birds representing 23 species. The following parasites have been detected: *Halteridium danilewskyi* on 57 occasions; *Haemamoeba relicta*, 9; *Leucocytozoon danilewskyi*, 21; Haemogregarina, 1; Toxoplasma, 2; Trypanosoma, 5; Spirochaeta, 1; and Microfilaria, 5.

Brief descriptions and text figures are given of these.

SMITH (Theobald) & FLORENCE (Laura). *Encephalitozoon cuniculi* **as a Kidney Parasite in the Rabbit.**—*Jl. Experim. Med.* 1925. Jan. 1. Vol. 41. No. 1. pp. 25–35. With 3 plates.

This parasite has been under observation in the author's laboratory since it was first seen in 1918. References are given to the descriptions of it that have appeared in print since the first published account by WRIGHT and CRAIGHEAD in 1922.

Since October, 1922, the authors have found 45 cases of infection out of 163 autopsies made.

Observations indicate that all individuals in a litter are not invaded sufficiently heavily to cause symptoms. The parasite has been found in young rabbits only (under six weeks).

The most frequent seat is in the epithelium of the collecting tubes near the tip of the papilla. It is sometimes seen in the loop of Henle, and but rarely in the convoluted tubes and Bowman's capsule. The invaded cells may contain large numbers of individual parasites. When large numbers are present the invaded cells swell up and finally burst. The individuals are 2·5 to 3μ in length and 1·5 to 2μ broad, and they have rounded ends. Certain appearances suggest that they are protozoal in origin. There are, for example, sometimes present forms which have the appearance of being pan-sporoblasts.

It is suggested that the parasite is a kidney parasite somewhat resembling Klossiella, and that several asexual generations are passed in that organ.

Whether the organism is a true parasite of the rabbit or an aberrant form from an insect host is a point still unsettled. The development of the parasite in tissues other than the kidney and in animals other than the rabbit suggest the latter, but the wide geographical distribution of the parasite in rabbits suggests the former.

LUKES (Jean). **Sur la présence de spirochètes chez les chiens atteints de gastro-entérite et sur le rôle pathogène possible de ces micro-organismes.** [The Presence of Spirochaetes in Dogs suffering from Gastro-Enteritis, and the Possible Pathogenic Rôle of these Parasites.]—*Ann. Inst. Pasteur.* 1924. June. Vol. 38. No. 6. pp. 523–528.

In 1922 the dogs in Brno suffered from a haemorrhagic gastro-enteritis accompanied by ulcerative stomatitis.

Silver impregnation methods were applied to the organs of a number of the cases and 17 out of 22 showed spirochaetes. In all cases the parasite was present in the kidneys, in 7 they were found in the liver, in 6 in the spleen, in 6 in the walls of the large vessels, and in 3 in the pancreas. The organs of three control dogs dead of other diseases showed none.

During 1923, 8 further cases came under observation, and the kidneys of 7 of these contained spirochaetes.

The parasite was readily transmitted to the guineapig. Thirteen were inoculated and 8 died. There is no rise of temperature at the beginning of the infection, but after a period of incubation of about a week the animals become dull and begin to waste. There is marked thirst and polyuria.

A few experiments have been carried out with dogs (4). One positive result was obtained by feeding with urine after neutralization of the gastric juice. Death took place on the 14th day from stomatitis and haemorrhagic gastro-enteritis.

The parasite is best seen in sections treated by Levaditi's method. They measure 5–20μ in length, but some appear to be much longer and to be formed of two individuals jointed together by a slender thread. These appear to be dividing. The bodies have knob-like formation or rings at their ends. In the living state the spirochaetes do not show much movement of translation.

Attempts at culture have not been very successful, but the best results have been obtained by dropping fragments of the tissue containing the parasite into broth, and incubating the tubes for about 10 days at 37° C. The cultures have been contaminated as a rule. Subcultures have been made in broth or in diluted serum with the addition of renal extract. No paraffin has been used.

The lesions found are as follows: In one-third of the animals buccal lesions have been found, erosions and ulcerations. These may heal before death occurs.

The alimentary canal contains a blood-stained liquid, and the walls show haemorrhages and possibly ulcerations.

The liver is enlarged and hyperaemic, but there is seldom any jaundice. The pancreas is oedematous, and sometimes shows necrotic centres.

The kidneys are enlarged and congested. Microscopic examination shows that the epithelium of the convoluted tubes is disintegrated, the débris obstructing the lumen. In other cases the picture is one of acute interstitial nephritis.

Finally, in chronic cases, there are found urinary casts, proliferation of the cells, fibrinous exudate and proliferation and desquamation of the cells of Bowman's capsule.

The lungs may be healthy, but there may be congestion and oedema. The pleura, on the other hand, is the seat of lesions which appear to be specific; there are haemorrhages about the size of beans.

The aorta may show endarteritis, and on microscopic examination mononuclear infiltrations may be found.

The spleen pulp is congested and shows haemorrhages.

GERLACH (F.). **Geflügelspirochätose in Oesterreich.** [Avian Spirochaetosis in Austria.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1925. Jan. 20. Vol. 94. No. 1. pp. 45–51.

Spirochaetosis is more common in birds in Austria than has been supposed. Observations made during the last year indicate that it is very widespread. Possibly it has become more common since the war, but it is not unlikely that it was overlooked formerly.

The lesions are enlargement of the spleen and kidneys, yellowish or greyish centres in the liver, catarrh of the intestine, and occasionally pneumonia and serofibrinous peritonitis.

Argas ticks were never found, but *Dermanysus* was present in large numbers.

No success followed attempts to cultivate the parasite.

Natural recovery frequently occurred, and recovered birds appeared to possess a high degree of immunity.

BÉDIER (E.). **Piroplasme de la mangouste d'Afrique** *Herpestes calera* **Erxleben.** [Piroplasma of the African Ichneumon.]—*C.R. Soc. Biol.* 1924. Feb. 22. Vol. 90. No. 6. pp. 415–417.

BLANCHARD (M.) & LAIGRET (J.). **Résultats éloignés du traitement de la maladie du sommeil par les fortes doses d'atoxyl. Traitement curatif et atoxylisation prophylactique.** [Treatment of Sleeping Sickness with Atoxyl, both Curatively and Prophylactically.]—*Ann. Inst. Pasteur.* 1924. June. Vol. 38. No. 6. pp. 460–469.

FRANCHINI (G.). **Ricerche sui protozoi e sulle microfilarie nei cani in provincia di Bologna e di Ferrara.** [Canine Protozoa and Microfilariae in Bologna and Ferrara.]—*Pathologica.* 1925. Jan. 1. Vol. 17. No. 387. pp. 19–21.

VAN SACEGHEM (R.). **Le pouvoir empechant dans les trypanosomiases.** [Inhibition in Trypanosomiasis.]—*Bull. Agric. Congo Belge.* 1923. Dec. Vol. 14. No. 4. pp. 610–612.

This note has appeared elsewhere and has already been abstracted. See this *Bulletin.* 1924. Vol. 12. p. 42.

SULDEY (E. W.). **Dysenterie amibienne spontanée chez le chimpanzé** (*Troglodytes niger*). [Spontaneous Amoebic Dysentery in the Chimpanzee.]—*Bull. Soc. Path. Exot.* 1924. Nov. 12. Vol. 17. No. 9. pp. 771–773.

DISEASES DUE TO METAZOAN PARASITES.

SCHWARTZ (B.). **Preparasitic Stages in the Life History of the Cattle Hookworm** (*Bustomum phlebotomum*).—*Jl. Agric. Research.* 1924. Nov. Vol. 29. No. 9. pp. 451–458.

At a temperature of 70°–80° F. the eggs of the parasite require about four days for hatching. Two periods of lethargus, each lasting about 24 hours, are separated from each other by two periods of vitality, each also lasting 24 hours.

In liquid cultures both cuticles are usually retained by the larvae, but in solid cultures the first cuticle is cast off.

The infective larvae are only moderately active at room temperatures, and they appear to be more resistant than the pre-infective larvae. They are positively thermotropic, turning the cephalic extremity towards a source of heat. In a solution of 1 per cent. basic fuchsin the infective larvae remain alive and apparently unaffected by it. After several hours' exposure the stain does not penetrate beyond the sheath. While desiccation is fatal, vitality is maintained where there is a small amount of moisture.

The larvae collect in the part of the culture medium where the light is strongest. They climb up the walls of containing vessels, but it is not certain whether this is the result of negative geotropism or the effect of light.

The larvae have not been found to show any tendency to penetrate skin.

SMILLIE (W. G.) & PESSOA (S. B.). **Treatment of Hookworm Disease with a Mixture of Carbon Tetrachloride and Ascaridol.**—*Amer. Jl. Trop. Med.* 1925. Jan. Vol. 5. No. 1. pp. 71–80.

The ideal treatment for hookworm infestations should possess the following characteristics :—

A single treatment should be efficient. It should remove other common intestinal parasites. It must be non-toxic, easy to administer, and inexpensive.

Carbon tetrachloride may be inefficient in small doses, 1 to 1·5 cc., and toxic in doses of 3–4 cc.

Ascaridol is next in efficiency.

Ascarides and male hookworms are especially susceptible to ascaridol, while the females resist this but are removed by carbon tetrachloride. A mixture of reduced doses may therefore be given without decreasing toxicity, but the mixture must not be allowed to stand for long because the carbon tetrachloride is volatile. If ascaridol, the active principle of chenopodium, is not available, carbon tetrachloride may be mixed with the oil of chenopodium in the proportion of 2 and 1.

WARE (F.). **A Case of Habronemiasis in England.**—*Jl. Comp. Path. & Therap.* 1924. Sept. Vol. 37. No. 3. pp. 160–162.

The animal, a thoroughbred, had never been out of England.

The history of the case was that the animal had been noticed to lose condition very suddenly about three weeks previously. It chewed small amounts of food, but did not swallow it, the faeces were normal in appearance, but only small amounts were passed. The urine was usually cloudy. The temperature was subnormal and the pulse slow. At times patchy sweating was observed.

The spleen, which was very dark in colour and resilient to the touch, weighed 18 lb. The whole of the other abdominal viscera appeared to be extraordinarily small. The mucous membrane of the last six feet of the small intestine was very oedematous, and the muscular coats were thickened. The sacculations of the first portion of the double colon contained small collections of dried ingesta which appeared to have had all moisture pressed out of them, and had thus been moulded into irregular shapes by the bowel.

The heart was flaccid. The other organs appeared to be normal.

On opening the stomach it was found to contain about a pint of yellow liquid and a pultaceous mass of green foodstuff. The mucous membrane was covered with a greenish yellow fibrinous exudate, and showed about a score of gastrophilus larvae. In the liquid there were found large numbers of *Habronema microstoma*.

It is of interest that this species, the occurrence of which in England is here recorded for the second time, requires *Stomoxys calcitrans* for the completion of its life cycle, whereas *H. megastoma* and *H. muscae* are transmitted by the common house fly, and one would therefore have thought that these species would perhaps have been met with not infrequently.

BOULENGER (C. L.). **The Filariid of the Camel,** *Acanthocheilonema evansi* **(Lewis).**—*Parasitology*. 1924. Dec. Vol. 16. No. 4. pp. 419–423. With 4 text-figs.

The author supplements and corrects the account of this parasite given by BAYLIS and DAUBNEY.

GAYCHET (M. P.). **Ophtalmie vermineuse du boeuf.** [Verminous Ophthalmia in the Ox.]—*Rev. Vétérinaire*. 1924. Oct. Vol. 76. No. 10. pp. 598–600.

The author records the occurrence of a worm 2 centimetres long in the anterior chamber of the eye of a cow. After some delay the owner agreed to surgical interference and the aqueous humour was released by a transverse incision across the lower margin of the cornea. No information is given as to whether the worm was found in the liquid when it was released and whether it was examined.

BAYLIS (H. A.). **The Range of Variation of** *Hymenolepis nana* **in Rats and Mice.**—*Parasitology*. 1924. Dec. Vol. 16. No. 4. pp. 415–418.

The author gives reasons for believing that his species *H. longior* is not distinct, but a synonym of *H. nana*.

VAN SACEGHEM (R.). **Remarque sur la dispersion geographique de l'***Ornithodorus moubata*. [The Geographical Distribution of *Ornithodorus moubata*.]—*Bull. Agric. Congo Belge*. 1923. Dec. Vol. 14. No. 4. pp. 612–613.

O. moubata is not found in the jungles of the Lower Congo (RODHAIN). Van Saceghem finds that it is absent in the volcanic areas of Ruanda and Kivu.

Kissenyi, on the northern shore of Lake Kivu, is of volcanic origin, and although numerous caravans pass through, and must bring the tick with them, the place does not become infested. It is suggested that the chemical changes which occur in the volcanic soil make it unfavourable for the parasite.

Ross (I. C.). **The Bionomics of** *Ixodes holocyclus* **Neumann, with a Redescription of the Adult and Nymphal Stages and a Description of the Larvae.**—*Parasitology*. 1924. Dec. Vol. 16. No. 4. pp. 365–381. With 1 plate and 2 text-figs.

The work was carried out as a preliminary to research regarding the nature of the causative agent of tick paralysis. The tick is of economic importance along almost the whole coastal region of Eastern Australia as a cause of fatal paralysis in cats and dogs. Foals, calves and lambs are also said to be affected and authenticated cases of the disease in children are on record.

MacGregor (M. E.). **Tests with** *Chara foetida* **and** *C. hispida* **on the Development of Mosquito Larvae.**—*Parasitology*. 1924. Dec. Vol. 16. No. 4. pp. 382–387.

Experiments indicated that extracts of the plants had no useful application as anti-mosquito substances.

Chandler (A. C.). **New Filariae from Indian Birds.**—*Parasitology*. 1924. Dec. Vol. 16. No. 4. pp. 398–404. With 10 text-figs.

van Cleave (H. J.). **Additional Notes on the Acanthocephala from America described by J. E. Kaiser [1893].**—*Centralbl. f. Bakt.* 1. Abt. Orig. 1925. Jan. 20. Vol. 94. No. 1. pp. 57–60. With 5 text-figs.

Cram (E. B.). **A New Nematode,** *Cylindropharynx ornata*, **from the Zebra, with Keys to Related Nematode Parasites of the Equidae.**—*Jl. Agric. Res.* 1924. May 17. Vol. 28. No. 7. pp. 661–672. With 8 text figs.

Dive (G. H.) & Lafrenais (H. M.). **A Case of Deposition of the Eggs of** *Hepaticola hepatica* **in the Human Liver.**—*Jl. Royal Army Med. Corps.* 1924. July. Vol. 43. No. 1. pp. 1–4. With 2 plates.

Hall (M. C.) & Shillinger (J. E.). **Critical Tests of Miscellaneous Anthelmintics.**—*Jl. Agric. Res.* 1924. Oct. 1. Vol. 29. No. 7. pp. 313–332.

Korke (V. T.). **On a New Microfilaria from the Dog.** *Microfilaria lewisii* **(N.S.).**—*Indian Jl. Med. Res.* 1924. Apr. Vol. 11. No. 4. pp. 1231–1237. With 1 plate.

——. **Revision of the Type Species of Rudolphi in India.**—*Indian Jl. Med. Res.* 1924. Apr. Vol. 11. No. 4. pp. 1239–1243. With 2 text-figs.

Lagrange (M. E.). **Sur un Trichocéphalidé du rat, à Shangaï,** *Hepaticola hepatica*, **Hall 1916.** [A Trichocephalide of the Rat. *Hepaticola hepatica*.]—*Bull. Soc. Path. Exot.* 1924. Oct. Vol. 17. No. 8. pp. 658–659.

MacGregor (M. E.). **Special Apparatus and Technique for the Study of Mosquitoes and other Aquatic Insects.**—*Parasitology*. 1924. Dec. Vol. 16. No. 4. pp. 388–397. With 7 text-figs.

Senevet (G.). **Description de la Nymphe de** *Hyalomma mauritanicum* **Senevet 1922.** [Description of the Nymph of *Hyalomma mauritanicum* Senevet 1922.]—*Arch. Inst. Pasteur d'Algérie*. 1924. June. Vol. 2. No. 2. pp. 233–234. With 4 text-figs.

—— & Rossi (P.). **Contribution à l'étude des Ixodidés (XII^e Note). Etude saisonnière des Ixodidés de la région de Bouira (Algérie).** [A Seasonal Study of the Ixodidae in the Bouira Area in Algeria.]—*Arch. Inst. Pasteur d'Algérie*. 1924. June. Vol. 2. No. 2. pp. 223–232.

STUNKARD (H. W.). **A New Trematode, *Oculotrema hippopotami*, n.g., n.sp., from the Eye of the Hippopotamus.**—*Parasitology.* 1924. Dec. Vol. 16. No. 4. pp. 436–440. With 1 plate.

WOODLAND (W. N. F.). **On the Development of the Human *Hymenolepis nana* (Siebold 1852) in the White Mouse; with Remarks on "*H. fraterna*," "*H. longior*," and *H. diminuta*.**—*Parasitology.* 1924. Dec. Vol. 16. No. 4. pp. 424–435.

BACTERIAL DISEASES.

SANARELLI (G.). **Charbon "interne" chez les animaux rendus "porteurs" de spores charbonneuses.** ["Internal" Anthrax in Animals that are Carriers of Anthrax Spores.]—*C. R. Acad. Sci.* 1924. Nov. 17. Vol. 179. No. 20. pp. 1100–1103.

It is known that guineapigs and rabbits can be fed with material containing anthrax spores without showing any evidence of infection, although cultures can be obtained from the organs of those animals after a lapse of some hours.

The effect of spores introduced into the lungs appears to be uncertain, partly because of the difficulty of assuring entire absence of wound infection. Sanarelli states that it is possible to introduce a suspension of anthrax spores into the lungs of a rabbit by using a syringe which is covered with rubber at the nozzle. This is inserted into one nostril, while the other is closed with the finger. The liquid in the syringe can be injected through the nasal fossa direct to the lungs. A dose of 50,000 spores suspended in 2 cc. of liquid injected in this way does not cause anthrax, but twice this dose does because the defensive cells of the body are not able to deal with so large a number. 150,000 spores may be placed in the nasal fossa without causing infection, but infection results if the same dose is injected into the lungs. The phagocytized spores behave like washed tetanus spores and in the course of time are digested. If a substance which produces cytolysis, such as arsenic, quinine, lactic acid, etc., be injected into one of the organs or even under the skin, before digestion has occurred, anthrax spores germinate and infection results.

MONOD (T.) & VELU (H.). **L'intradermovaccination en un temps contre le charbon bactéridien et ses avantages.** [The Advantages of the Single Intradermo-Vaccination against Anthrax.]—*C. R. Soc. Biol.* 1925. Feb. 5. Vol. 92. No. 4. pp. 251–253.

During the year 1924 the following numbers of animals were vaccinated by the intradermal method: Cattle, 14,405; Sheep, 2,520; pigs, 4,640; and horses, 75. The veterinary officers carrying out the inoculations were requested to forward comments on the method. The process was not followed by any reaction, but in one herd piroplasmosis (not verified) made its appearance. Accidents of this kind have been observed before.

The conclusions drawn from the reports received were as follows:—

The single intradermo-vaccination confers a solid immunity, and protected cattle resist infection in heavily contaminated areas.

The vaccination can be carried out even during an outbreak without recourse to previous serum protection, in spite of the fact that there is a slight increase in susceptibility from the 24th to the 48th hour.

The method appears to be at least as effective as the subcutaneous inoculation, and resistance is promptly established.

VELU (H.). **Essai concluant d'intradermovaccination contre le charbon bactéridien en milieu profondément infecté.** [Intradermo-Vaccination against Anthrax on Heavily Contaminated Premises.]—*Bull. Soc. Path. Exot.* 1924. Nov. Vol. 17. No. 9. pp. 767–770.

This paper contains the records of intradermo-vaccinations against anthrax carried out on premises where the disease regularly appeared four to five months or more after vaccination had been carried out in the ordinary way. Such failures to protect have been recorded in other countries, and they can be guarded against to some extent by the employment of a third vaccine which is only slightly attenuated. This, however, is not practicable in Morocco.

The intradermo-vaccinations were carried out with attenuated strains of the anthrax supplied by THEILER.

The results of experiments carried out on a considerable number of animals with a sufficient number of controls showed that the efficacy of the Pasteur vaccines is the same in Morocco as in France.

The vaccine prepared at Casablanca is at least as active as the Pasteur vaccines.

Intradermo-vaccination can be carried out, in colonial centres, even when an outbreak is actually in existence.

DESCAZEAUX (J.). **Essais de cutivaccination anticharbonneuse.** [Anti-Anthrax Cuti-Vaccination.]—*Bull. Soc. Path. Exot.* 1924. Nov. Vol. 17. No. 9. pp. 765–767.

Experiments in vaccination by scarification have been carried out on a horse, an ox, and five sheep. The vaccine was prepared from a culture which is described as being slightly less active for laboratory animals than the No. 3 vaccine of the Pasteur Institute.

Two types of vaccine have been used. In one " diadermine " was the excipient and in the other lanoline.

A horse, an ox, and one sheep were treated with the " diadermine " vaccine which was applied to scarifications of the skin. The large animals had about ½ cc. applied, and the sheep ¼ cc. Two sheep were treated with lanoline vaccine. One sheep had rubbed into a scarified area a triple dose of liquid vaccine. One sheep was kept as a control.

Six weeks later the ox and the horse were inoculated subcutaneously with ½ cc. of virulent culture, and the 5 sheep received ¼ cc. of the same material. The control sheep died within 48 hours.

Two vaccinated sheep died the following day and on the following day the other inoculated animals presented alarming symptoms. Anti-anthrax serum was used with beneficial results.

STRÖSZNER (E.). **Ueber Milzbrandimmunität und Milzbrandschutzimpfung.** [Immunity and Protective Inoculation against Anthrax.]—*Seuchenbekämpfung.* Vienna. 1925. Vol. 2. No. 1/2. pp. 79–90.

This paper is a review of the present state of knowledge regarding immunity to and protective inoculation against anthrax.

SANFELICE (Francesco). **Intorno alle mutazioni del bacillo del carbonchio.**—*Bol. d. Instituto Sieroterap. Milanese.* 1924. Nov. Vol. 3. No. 6. pp. 341–352. With 1 plate. [6 refs.]

This article is divided into six sections. In the first the author describes previous work on the anthrax bacillus showing that by subcutaneous injection of cultures into dogs, or by the use of collodion sacs in their peritoneal cavity, a non-sporing, non-pathogenic coccobacillus is produced. In the white rat a Gram-negative, coliform organism results, denominated by ZIRONI *Bacterium anthracis colisimile*, which is capable of immunizing small laboratory animals against virulent anthrax. Part II gives an account of the conditions under which the anthrax bacillus becomes transformed *in vitro* into the coccobacillary form, the chief of which are the absence of spores and of oxygen. The latter is amplified in a later section, where it is stated that growth in depth of agar or under oil after 10 days at 22°–24° C. is completely transformed from *Bacillus anthracis* to *Bacterium anthracis colisimile*. He next discusses the morphological and cultural characters of this organism and its pathogenicity. It must, he says, be regarded as a new species and not a mere mutation, because there is practically nothing in common between it and the original anthrax bacillus. The organism is Gram-negative, does not liquefy gelatin, does not spore, occurs singly or in twos, not in chains, is not agglutinated by anti-anthrax serum, and does not cause death even when inoculated in considerable quantities beneath the skin of a guineapig or rabbit. Intravenously, it kills in 24 hours with swelling of the spleen and liver. The author did not confirm the immunizing power of this against the true *B. anthracis*.*

ZIRONI (A.). **Osservazioni sul lavoro del prof. F. Sanfelice "Intorno alle mutazioni del bacillo del carbonchia."**—*Bol. d. Instituto Sieroterap. Milanese.* 1924. Nov. Vol. 3. No. 6. pp. 352–354.

This is a brief reply to the paper of SANFELICE in which it is stated that the latter was unable to confirm Zironi's results that the *B. anthracis colisimile* would immunize laboratory animals against virulent anthrax. Dr. Zironi modifies the statement by saying that three rats previously inoculated with pus from another rat which, as a result of injection of anthrax bacilli, had developed the *colisimile* variety, survived injection of virulent anthrax organisms while control animals succumbed, but that rats, guineapigs and a dog inoculated with *Bacterium anthracis colisimile* in large or small amounts did not thereby acquire any immunity to virulent anthrax.*

* Summarized by Dr. H. Harold Scott.

Brocq-Rousseu, Truche & Urbain (A.). **Vaccination contre la typhose aviaire par la voie digestive.** [Vaccination against *B. gallinarum* by the Alimentary Tract.]—*C.R. Soc. Biol.* 1924. Dec. 5. Vol. 91. No. 34. pp. 1185–1187.

Experiments have been carried out with emulsions of the organism killed by means of alcohol-ether mixture. The emulsion was made so that 1 cc. represented 1 mg. of dried bacilli. In the first experiment six fowls were given on successive days increasing doses of emulsion by the mouth. They were then given living cultures after an interval by inoculation intravenously. Three survived. From two of the three which died the organism was recovered. In a second experiment two birds were used and these were given bile (ox) and were then tested by feeding (?) with culture.

The context appears to indicate that these two birds were two survivors from the previous experiment, but the use of different numbers would appear to imply that they were not.

Smith (Theobald) & Orcutt (Marion L.). **The Bacteriology of the Intestinal Tract of Young Calves with Special Reference to the Early Diarrhoea ("Scours").**—*Jl. Experim. Med.* 1925. Jan. 1. Vol. 41. No. 1. pp. 89–106. With 1 plate.

The following is an abstract of the authors' conclusions :—

New-born calves which receive no colostrum or receive it only after some delay may die of a septicaemia due to *Bacillus coli*; the diarrhoea being a local manifestation of this.

If the amount of colostrum is not sufficiently protective the calves may become affected with arthritis, nephritis, omphalitis, and possibly pneumonia.

There is a balance between certain strains of *Bacillus coli*, the mucous membrane and the digestive ferments which, if upset in favour of *B. coli*, causes diarrhoea.

There is a great increase in the number of *B. coli* in the terminal portion of the small intestine, and this spreads forwards. General intoxication results. The bacilli form layers attached to the top plates of the epithelial cells.

Violle (H.). **Essais de vaccination cutanée contre *B. abortus* de Bang.** [Cutaneous Vaccination against the Abortion Bacillus (Bang).]—*C. R. Soc. Biol.* 1925. Feb. 20. Vol. 92. No. 6. pp. 421–422.

The experiments have been carried out with an American strain of *B. abortus*, and 3-day cultures on ordinary agar slopes have been employed. For the purpose of applying the dead cultures to the skin of the guineapigs an ointment was prepared with "axonge." Two guineapigs were carefully shaved on the abdomen so as to avoid any scarification. The ointment was then applied with friction over the shaved areas. Both guineapigs lost greatly in weight and died in about a month. Bacteria could be detected by the microscope in all the organs, and pure cultures of the bacillus were obtained on agar. The bacillus was agglutinated by specific serum obtained from Burnet (Tunis).

A second pair of guineapigs was inoculated in a similar manner, but before the live culture ointment was used they were treated three times at intervals of four days with ointment which had been sterilized by heating to 60° C. for one hour.

In this case there was no loss of weight save a very small one after three months. The animals were killed and both cultural and microscopic examination yielded negative results. It does not appear that there were any controls to show that the vaccine used was actually infective.

GAIGER (S. H.). **Anaerobic Infections in Animals.**—*Jl. Comp. Path. & Therap.* 1924. Sept. Vol. 37. No. 3. pp. 163–192.

MANNINGER (R.). **Beitrag zur Aetiologie und Prophylaxe des Rauschbrandes und des malignen Oedems der Wiederkäuer.** [The Etiology and Prophylaxis of Blackleg and Malignant Oedema in Ruminants.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1924. Aug. 22. Vol. 92. No. 5/6. pp. 418–424.

DISEASES DUE TO FILTERABLE VIRUSES.

ANDRIANI (S.). **Méthode simple et rapide pour mettre en évidence les corps de Negri dans la rage.** [A Simple and Rapid Technique for the Demonstration of Negri Bodies.]—*Ann. Inst. Pasteur.* 1924. June. Vol. 38. No. 6. pp. 520–522. With 1 text fig.

Thin slices (3 mm.) of Ammon's horn are fixed in acetone for one to two hours. These are embedded in paraffin by passing them through xylol, ½ hour, xylol-paraffin, ½ hour, and paraffin, 1 hour. Sections 5μ thick are fixed on slides or cover slips, and after the paraffin has been removed these are placed in the following solution for 5–10 minutes :—

Malachite green	20 centigrammes.
Orange G.	2 grammes.
90 per cent. alcohol	10 cc.
Distilled water	105 cc.

Without washing the slides are placed in the following solution :—

Chromic acid	50 centigrammes.
Potash alum	1 centigramme.
Distilled water	100 cc.

They remain in this for 2-3 minutes. After a brief wash they are placed in absolute alcohol, where the excess of green colour is removed and the sections acquire a pink tint. They are then passed through xylol and mounted in balsam.

The Negri bodies appear green. The cytoplasm and nuclei of the nerve cells are orange tinted and the neuroglia of a paler colour.

The specimens prepared in this way last for a considerable time.

KRAUS (R.). **Vorschläge zur Schutzimpfung gegen Hundswut.** [The Immunization of Dogs against Rabies.]—*Seuchenbekämpfung.* Vienna. 1925. Vol. 2. No. 1/2. pp. 71–74.

This short paper is divided into 2 parts.

The first part deals with the preservation of virulence of rabic material when it is placed in glycerin after a preliminary drying. This method results in an important economy being effected in materials.

The second part refers to the work which has been done in Japan in connexion with the immunization of dogs against rabies. The great increase in the number of dogs in Vienna during recent years has largely increased the danger of rabies. Muzzling has reduced the possibility of human beings being bitten, but by this means the disease cannot be stamped out.

LEVADITI (C.), NICOLAU (S.) & SCHOEN (R.). **La nature microsporidienne du virus rabique.** [The Microsporidian Nature of the Virus of Rabies.]—*C.R. Soc. Biol.* 1924. Feb. 22. Vol. 90. No. 6. pp. 398–402.

Examinations have been made of animals inoculated with fixed virus and street virus (Remlinger strain), and in no case have bodies resembling Negri bodies been found in those inoculated with fixed virus. A careful comparative examination has been made of the nervous system of a *Macacus cynomolgus* and material containing *Encephalitozoon cuniculi*.

The staining reactions, as shown by a number of different methods, of the two are very similar.

Treatment of specimens with hydrochloric acid prior to staining renders the membrane surrounding the parasite permeable to stains.

Negri bodies are found only in nerve cells the structure of which is not altered, and it appears to be probable that intact cells are necessary for their formation.

The authors believe that the microbe of rabies, which is filterable and ultravisible, gains access to the nerve cells and there undergoes a process of development which results in the formation of pansporoblasts or cysts which are the Negri bodies. The development of *Encephalitozoon cuniculi* is parallel. This organism is unable to develop save in intact and unaltered cells. When death of the cell results development of the parasite ceases, and phagocytosis occurs.

DE KOCK (G.). **Beiträge zur Kenntnis des Erregers, zur Hämatologie, pathologischen Anatomie und Histologie der infektiösen Anämie der Pferde, wie sie in Südafrika beobachtet wird.** [The Cause, Haematology, Pathological Anatomy and Histology of Infectious Equine Anaemia as observed in South Africa.]—*Folia Haematologica*. 1924. Dec. Vol. 31. No. 1. pp. 13–34.

This subject has been dealt with by de Kock in the 9th and 10th Reports of the Director of Veterinary Research, S. Africa. (See this *Bulletin*, 1924. Nov. 30. Vol. 12. No. 4. p. 136.)

LEBAILLY (M. C.). **Les mouches ne jouent pas de rôle dans la dissémination de la fièvre aphteuse.** [Flies play no Part in the Transmission of Foot and Mouth Disease.]—*C. R. Acad. Sci.* 1924. Nov. 24. Vol. 179. No. 21. pp. 1225–1227.

The author has carried out experiments which lead him to conclude that, in spite of popular opinion to the contrary, flies do not play any part in the dissemination of foot and mouth disease.

PANISSET (L.) & VERGE (J.). **Etudes sur la diphtérie aviaire. La réaction de Schick chez la poule.** [The Schick Test in Fowl Diphtheria.]—*C. R. Soc. Biol.* 1925. Jan. 16. Vol. 92. No. 1. pp. 7–8.

Fowl diphtheria is a contagious disease of birds due to a filterable virus, although the condition is held by some authors to be identical with human diphtheria.

The Schick test was carried out with diphtheria toxin obtained from the Pasteur Institute and diluted 1 in 1,000. By carrying out tests on a small number of healthy birds the authors obtained evidence that there is no connexion between human and avian diphtheria.

SCOTT (J. W.). **The Experimental Transmission of Swamp Fever or Infectious Anaemia by Means of Secretions.**—*Univ. of Wyoming Agric. Exp. Station Bull. 138.* 1924. June. 62 pp.

This bulletin contains descriptions of experiments designed to provide an answer to the question whether infectious anaemia may be transmitted through the medium of secretions.

In the first experiment a horse, which was admittedly a poor subject for experimental inoculation, was given a number of subcutaneous inoculations with washings of the nasal chamber of a chronic case. The result was inconclusive. Some of the serum of this animal was used for the inoculation of another horse. Again the result did not permit of the expression of a definite opinion as to the success of the experiment.

Another horse was used in this experiment also, but in this case the nasal washings were sprayed into the nose. Infection followed, and blood of this animal was used for the inoculation of another. The resulting reaction again indicated a positive result.

Two horses were injected subcutaneously with filtered nasal washings.

There appears to be some confusion of dates in the record of one of these animals and it is therefore a little difficult to follow the course of events. In neither case was infection clearly established.

An attempt to transmit the disease by direct transference of secretion from the eye of one horse to the eye of another failed.

Similarly, an attempt to infect with an extract of Tabanid flies yielded no result.

"The tabanids used in those experiments were collected in the midst of a large alfalfa field at a distance of one-half mile or more from any pasture which contained horses. By taking this precaution we were satisfied that the tabanids had had no chance of becoming infected or contaminated with the virus of swamp fever before they were used in our experiments."

A control was carried out by injecting an extract of the flies. No infection resulted. Infection with pernicious anaemia during pregnancy may lead to abortion, but there is no satisfactory evidence as to whether an infected mare transmits the infection to a foal born at full term.

MISCELLANEOUS.

TRUCHE (C.). **Moyen simple et pratique de conservation des germes.** [A Simple and Practical Method of maintaining Bacteria.]—*Ann. Inst. Pasteur.* 1924. June. Vol. 38. No. 6. pp. 516–519.

Bacteriologists are familiar with the difficulties of maintaining strains of organisms outside the body.

Frequent transplantations are often necessary to keep the cultures alive, and very often their virulence is profoundly modified. Animal passage, which can be utilized in some cases, may also lead to modifications of this character.

In 1918 UNGERMANN published an account of his method of using rabbit serum, diluted or not, and heated to 60° C. for half-an-hour for the preservation of bacteria, the serum being covered with a layer of sterile paraffin.

Truche has devised a modification of the method described by LEGROUX (1920) in which formolized serum is used. The organism which it is desired to preserve is sown out on an agar or serum agar slant, and incubated for 48 hours. With a sterile pipette 2 cc. of formolized serum is then spread over the culture, which is detached into the liquid by careful manipulation of the pipette. The liquid is then withdrawn by means of the pipette and placed in a small sterile tube. The author has kept a strain of Strangle's streptococcus for three years in this way, transplants being made only once a year. Other bacteria have been kept for many months, among which is the bacillus of fowl cholera.

It is advised that when it is necessary to utilize cultures frequently one tube should be kept unopened until transplantation is required, a number of parallel tubes serving current purposes.

TWORT (F. W.). **Further Modifications in the Preparation of Neutral Red-Light Green Double Stain, and an Improved Method of Embedding Tissues in Paraffin.**—*British Jl. Experim. Path.* 1924. Dec. Vol. 5. No. 6. pp. 350–351.

The author recommends the use of normal propyl alcohol as the solvent for the solid dye. One gram is ground up in 100 cc. of the solvent and the solution filtered. When required for use an equal amount of water is added. To avoid the shrinkage and hardening of tissues caused by the use of clearing agents Twort recommends that these may be replaced by butyl alcohol. A further advantage is that butyl alcohol will mix with dilute ethyl alcohol, so that absolute alcohol may be cut out of the process. Tissues were fixed in formalin-Müller, washed and placed in dilute ethyl alcohol. They were passed into 60 per cent. ethyl alcohol and thence into pure normal butyl alcohol. This was changed several times in the course of 2–3 hours, and the tissue was then passed through several changes of paraffin.

VAN SACEGHEM (R.). **Milieu de culture à la gomme arabique.** [A Gum Arabic Culture Medium.]—*Bull. Agric. Congo Belge.* 1923. Dec. Vol. 14. No. 4. p. 610.

Van Saceghem has employed for the cultivation of Pasteurella and Salmonella organisms a modification of the medium described by

COSTA and BOYER. The modification is the substitution of gum arabic for gum tragacanth. He considers that the moisture and viscosity imparted to the medium are the factors favouring growth.

STAMMERS (A. D.). **Oedema of South African Cattle.**—*British Jl. Experim. Path.* 1924. Dec. Vol. 5. No. 6. pp. 313–317.

The disease occurs after a period of prolonged drought which usually occurs from June to September in the higher altitudes in South Africa.

Three animals were condemned as unsuitable for food at Johannesburg, and since it has been suggested that oedema may be a deficiency disease it was decided to investigate the chemical changes, if any, in bone, bone marrow, adipose tissue, and muscle.

Tabular statements show the results of these analyses, and the results of analyses of normal tissue are given for comparison.

In the analyses of bone there was a definite decrease in moisture and a deficiency of protein and fat. The total ash was reduced and there was a disproportionate decrease in the phosphorus content.

There was marked replacement of adipose tissue by moisture. The bone marrow showed a decrease in fat, and the muscle showed a reduced protein content.

A few experiments were carried out with rats in which an attempt was made to reproduce the condition seen in cattle. Some evidence was obtained that a diet deficient in phosphorus tends to bring about the same state as that seen in cattle.

SEDDON (H. R.) & CARNE (H. R.). **A Peculiar Disease affecting the Ear of Pigs.**—*Queensland Agric. Jl.* 1924. Nov. Vol. 22. No. 5. pp. 375–376.

This account of the work is taken from the *Agricultural Gazette of New South Wales*, June, 1924.

The disease is of common occurrence in Queensland, and is seen most commonly among young pigs from a few weeks to four months old.

It is characterized by a peculiar alteration in the carriage of the head and sometimes unsteadiness of gait. The head is rotated to one side or the other so that the affected ear is at a lower level than the other, and in walking the animal tends to turn towards this side. There is often discharge from the eyes and nose, and general poverty of condition. Examination of the ear reveals a brownish sticky discharge in its interior. Examination has shown that in these cases there is a collection of pus in the middle ear which tends to cause rupture of the drum.

In the note under review the cause of the disease is described rather indefinitely as follows: Examination of the pus shows the presence of bacteria such as are commonly met with in other suppurative conditions in the pig.

KIMURA (T.). **On "Orchidoma" or "Orchidoblastoma" of the Horse.**—*Sei-i-Kwai Med. Jl.* 1924. Dec. Vol. 43. No. 6. pp. 1–6.

This paper contains statistics of the number and type of tumours occurring in animals slaughtered for food in Japan during the period 1908–1915.

Over 77,000 horses have been killed during this period and tumours were found in 142. During the same period over 241,000 cattle and 477,000 pigs were slaughtered. Tumours were found in 15 and 3 of these respectively.

Of the animals showing tumours 114 were horses and 28 mares, and the tumours involved the testicles in 49 instances.

The tumours occur most frequently in stallions that are fifteen years or more old, and as a rule only one testicle is involved.

Microscopic examination shows that the growths arise as the result of proliferation of the epithelium of the seminiferous tubules. Metastases via the lymphatic system are frequently seen.

CAMERON (A. E.). **Some Further Notes on Buffalo.**—*Veter. Jl.* 1924. Nov. Vol. 80. No. 11. pp. 413–418.

The author gives an account of some of the anatomical features of the American buffalo. The details were gathered during the slaughter of a large number of animals at the Buffalo Park, Wainwright, Alberta.

MALONE (R. H.). **A Simple Method of preparing Collodion Capsules for Use in the Study of Biological Problems.**—*Indian Jl. Med. Research.* 1924. Apr. Vol. 11. No. 4. pp. 1227–1229. With 1 plate.

BOOK REVIEW.

KAUPP (B. F.). [B.S., M.S., D.V.M.] **Animal Parasites and Parasitic Diseases.** Fourth Edition, revised. xvi+250 pp. With 15 plates and 81 text figs. 1925. London. Baillière, Tindall & Cox, 8, Henrietta Street, Covent Garden. [Price 12s. 6d.]

We learn from the Author's Preface that the Fourth Edition of this work "has been thoroughly brought down to date, specially revising those facts dealing with the parasites of poultry, hogs, dogs and sheep, and the best means of medication and methods of eradication of these parasites."

This brochure is presumably intended for the clinician, who may find in it some useful hints as to treatment, but the same cannot be said with regard to the all-important matter of diagnosis. The nomenclature adopted is frequently not that of the present day, for we find such terms as *Uncinaria cernua* of the sheep and goat, *Taenia canina* and *Coccidium perforans* of the dog, and in some cases, owing to the absence of a synonomy, it is difficult to trace the exact parasite to which reference is made.

In addition, no rule appears to have been followed in the selection of parasites for mention. For instance, while quite a full description is given of such a rarity as *Simondsia paradoxa* of the pig, the only members of the Trichostrongylidae mentioned as inhabiting the alimentary tract of ruminants are *Haemonchus contortus* and *Strongylus ostertagi*.

The work contains chapters on the Ectozoa, Entozoa, and Protozoa, and is profusely illustrated. Some of the illustrations in the Ectozoa section are deserving of praise, particularly those of the Mange Acari, but most of the freehand work is crude, and the micro-photographs have the usual drawbacks of this method for illustrating Helminths.

F. Ware.